

WHAT IS CLAIMED IS:

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1. An optically-pumped laser device, comprising:
a nonionic base layer; and
an ionic layer attached to said nonionic base layer through an optical-quality interface, a cross-section through said device in a direction perpendicular to said interface having a trapezoidal shape.
 2. The laser device of claim 1, wherein said optical-quality interface is a diffusion-bonded interface.
 3. The laser device of claim 1, wherein said optical-quality interface is a layer-growth type interface.
 4. The laser device of claim 1, wherein all cross-sections passing through said optical-quality interface in a direction perpendicular to said interface have a trapezoidal shape.
 5. The laser device of claim 1, wherein said nonionic layer and said ionic layer form a laser slab, said laser slab having a bottom surface and two side surfaces, an angle between said side surfaces and said bottom surface being about 60°.
 6. The laser device of claim 1, wherein said nonionic layer is a YAG layer and said ionic layer is a Yb:YAG layer having a ytterbium concentration of about 15%.
 7. The laser device of claim 1, wherein said nonionic layer has a thickness of about 3.25 mm and said ionic layer has a thickness of about 0.25 mm.
 8. The laser device of claim 1, wherein said ionic layer has an isolation groove.

16. The method of claim 9, wherein providing a laser slab includes providing a laser slab having a trapezoidal cross section through both said nonionic layer and said ionic layer in a direction perpendicular to said interface.

17. An optically-pumped laser slab, comprising:

a YAG layer; and

a Yb:YAG layer attached to said YAG layer along optical-quality interface by diffusion bonding, said Yb:YAG layer having a ytterbium concentration of approximately 15%, a cross section through said laser slab in any plane perpendicular to said optical-quality interface having a trapezoidal shape, said laser slab having a bottom surface and two side surfaces tilted inwardly from the bottom surface at an angle of about 60°.

18. A method of manufacturing a laser device, comprising:

providing a nonionic layer having a bottom surface;

providing an ionic layer;

connecting the ionic layer and the nonionic layer through an optical quality interface with said nonionic layer at a position opposite said bottom surface of said nonionic layer; and

polishing at least two lateral surfaces of said nonionic layer and said ionic layer to form side surfaces, said polishing being at an angle to said optical quality interface so that a cross-section through the ionic layer and the nonionic is trapezoidal in shape, with said bottom surface of said nonionic layer having a greater surface area than said optical quality interface.

19. The method of claim 18, wherein said polishing is at an angle of approximately 60° from the optical quality interface.

20. The method of claim 18, wherein fabricating a nonionic layer comprises fabricating a YAG layer.

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30. The laser slab of claim 26, wherein said side walls are so shaped as to provide parabolic profiles in a cross-section in a direction perpendicular to said interface.

31. The laser slab of claim 26, wherein said ionic layer has an isolation groove.

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